

**Commonwealth of Kentucky
Division for Air Quality**

PERMIT APPLICATION SUMMARY FORM

Completed by: Joshua J. Higgins

GENERAL INFORMATION:

Name: Dart Polymers, Inc.
Address: 2400 Harbor Road, Owensboro, Kentucky 42301
Date application received: 11/18/02
SIC/Source description: 2821
EIS #: 21-059-00131
Application log number: 55337 / 55642
Permit number: V-00-003, Revision 1

APPLICATION TYPE/PERMIT ACTIVITY:

<input type="checkbox"/> Initial issuance	<input type="checkbox"/> General permit
<input checked="" type="checkbox"/> Permit modification	<input type="checkbox"/> Conditional major
<input checked="" type="checkbox"/> Administrative	<input checked="" type="checkbox"/> Title V
<input checked="" type="checkbox"/> Minor	<input checked="" type="checkbox"/> Synthetic minor
<input type="checkbox"/> Significant	<input type="checkbox"/> Operating
<input type="checkbox"/> Permit renewal	<input type="checkbox"/> Construction/operating

COMPLIANCE SUMMARY:

<input type="checkbox"/> Source is out of compliance	<input type="checkbox"/> Compliance schedule included
<input type="checkbox"/> Compliance certification signed	

APPLICABLE REQUIREMENTS LIST:

<input type="checkbox"/> NSR	<input checked="" type="checkbox"/> NSPS	<input checked="" type="checkbox"/> SIP
<input type="checkbox"/> PSD	<input checked="" type="checkbox"/> NESHAPS	<input type="checkbox"/> Other
<input checked="" type="checkbox"/> Netted out of PSD/NSR	<input type="checkbox"/> Not major modification per 401 KAR 51:017, 1(23)(b) or 51:052,1(14)(b)	

MISCELLANEOUS:

☐ Acid rain source
☐ Source subject to 112(r)
☐ Source applied for federally enforceable emissions cap
☒ Source provided terms for alternative operating scenarios
☒ Source subject to a MACT standard
☐ Source requested case-by-case 112(g) or (j) determination
☐ Application proposes new control technology
☒ Certified by responsible official
☒ Diagrams or drawings included
☐ Confidential business information (CBI) submitted in application
☐ Pollution Prevention Measures
☐ Area is non-attainment (list pollutants):

EMISSIONS SUMMARY:

Pollutant	Actual (tpy)	Potential (tpy)
PM/PM ₁₀	N/A	N/A
SO ₂	N/A	N/A
NO _x	N/A	N/A
CO	N/A	N/A
VOC	100.684	459.482
LEAD	N/A	N/A
HAP \geq 10 tpy (by CAS)		
100-42-5 (styrene)	52.675	52.675
Total HAPs:	52.675	52.675

SOURCE PROCESS DESCRIPTION:

Dart Polymers, Inc (“Dart”) owns and operates a polystyrene beads, and pellets manufacturing plant and an impregnation facility in Owensboro, Kentucky. This source is a major source for VOC’s and HAP’s. The primary activity at the Owensboro facility is the polymerization of polystyrene, which falls under SIC code 2821. There are three primary production processes at the facility. They are Polystyrene Pellets (Mass Plant), Impregnated Polystyrene beads, and Polystyrene Beads (Suspension Plant).

Dart polymers is planning on converting its existing Mass Plant line 1 from batch to continuous service. They will continue to produce polystyrene pellets on this line, but at an increased rate. Once converted, the line will operate similar to line 3 in the same plant, which currently operates under Permit # V-00-003. Dart intends to start work on this project in July of 2003, and the throughput rate on the converted line will be 8800 pounds per hour.

The feed solution, comprised of styrene, dissolved rubber solution, ethylbenzene and mineral oil, is pumped on a continuous basis through a feed preheater(s) where the temperature of the solution is raised to the initial reaction temperature. The solution is transferred from the feed preheater to the pregraft reactor, where initial polymerization occurs in the presence of an organic initiator.

From the pregraft reactor, the partially polymerized solution is pumped to a second (prepolymerization) reactor, where a slightly higher temperature is maintained in order to facilitate further polymerization. Styrene and ethylbenzene vapors are drawn off of this reactor and condensed before being returned to the reactor as liquid reflux.

The partially reacted mixture is then transferred to a tower reactor where polymerization is completed. The molten polystyrene passes through two devolatilizers for the removal of residual styrene, ethylbenzene, and oligomers. These residuals are condensed and returned to the process feed as recycle in a closed loop system. Finally, the molten polystyrene is drawn into strands, cooled in a water bath and cut into pellets before being transferred to storage silos.

EMISSION AND OPERATING CAPS DESCRIPTION:

Dart was previously issued a synthetic minor permit, limiting the emissions from a de-bottle necking project in the Impregnation Plant to 10.51 TPY. The emissions from the modification will always be under the limit of 10.51 TPY as long as the emissions are vented to the carbon adsorber. The permit conditions Dart to vent the emissions from the affected units listed in Plant 2 above to the carbon adsorber all the time. The permit also conditions the control efficiency of the carbon adsorber to be at least 95%.

OPERATIONAL FLEXIBILITY:

With this minor modification application Dart has requested that in the event that the Line 1 Prepoly Reactor (R-1310) is operated without reflux (e.g., no material flows through the reflux condenser C-1310), R-1310 will be isolated from the reflux condenser and operated under pressure rather than vacuum, which will result in less material flow to the vacuum vent (M-7). From a product consistency point of view, this would not be a desirable operating condition for Dart, and would only be used when a malfunction of the reflux system occurred. All the requirements including the applicability of 40 CFR 63, Subpart JJJ and the emission limits will continue to apply as described in Section B (Pages 6 through 9) of the permit.